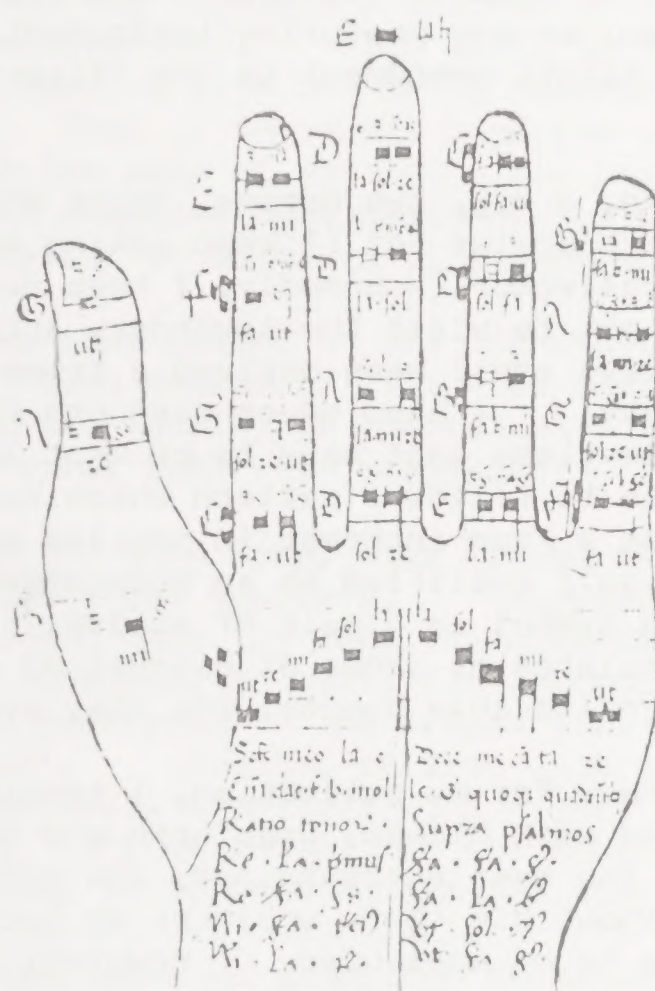




INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

NEWSLETTER No 8

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Medieval Scales

Hi~~

from BRIAN & JANICE BRASS

2^a HILL CRESCENT, TOTTERIDGE, LONDON, N 20.

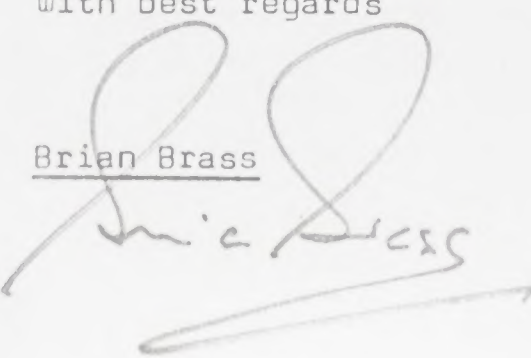
I am ill equipped to produce this newsletter in the style and quality of my predecessors. Like most other pursuits in which I am involved, I collect scales partly for fun and partly for the probability of contact with interesting people. So far, I have not been disappointed. My collection is relatively small and only in the past year or so (due in no small measure to the encouragement from Michael Crawforth) has it begun to develop into something worthwhile. I was overjoyed to receive the first newsletter from Bob Stein but my enthusiasm waned as each successive issue has become more and more erudite. Morton Wormser's letter brought some relief on reading the first page but this evaporated completely on seeing the sketches of the more exotic items from his collection. I have only one mystery in my lot (even Michael with his encyclopaedic knowledge confesses to being baffled) but if I tried to draw it for you it would come out looking like the Eiffel Tower. Despite the final effort, I became more and more nervous as the deadline got nearer. Incidentally, the illustration overleaf was originally included as a joke and represents the Guidonion hand, a medieval scheme supposedly derived from and illustrating the sol fa principles of Guido d'Arozzo. On reflection, however, it seems just as pertinent as any measuring instrument. UK aficionados may also notice some slight amendment to the 'flyer' to comply with our A4 standard paper size.

We have three children, a dog, two horses, three chickens and tropical fish - what the hell do I need scales for (I keep asking myself)? I regard myself as a part-time collector (ashamedly, I have never been to Portobello Road market and have yet to visit the legendary Arthur Middleton in his Barrett Street hideaway) and I have derived a tremendous amount of pleasure from this curious hobby. I have never been one for stamps or coins or any of the other collections that have to be kept locked away in a drawer or a bank, so scales seem to follow a pattern which has gradually established itself. I developed a keen interest in mobiles as an art form at an early age and then found myself qualified as an accountant in a professional association where the symbol is a pair of scales. In short, I find that scale collecting stimulates my sense of historical enquiry, that the objects of my passion have considerable beauty; and they are immensely practical.

Whatever fondness I have for my collection, I treasure above all the relationships I have formed with Michael Crawforth and Bob Stein. Michael is without doubt one of the most extraordinary and gifted individuals that I have ever met and without him there would be no Society. Bob's initiative in launching ISASC is to be applauded. However, I foresee certain problems in the continuance of the newsletter in its present form. Maybe if there is to be an AGM this year maybe we can conceive some way of producing a journal from a central location.

My own contribution follows. I had a great deal of fun doing the research which took me to fresh fields and again broadened the spectrum of my friends and acquaintances. I only hope that you will find it interesting. To close, may I wish you all well, happy collecting, and I hope to see you whenever you are in London. I have not got much of a scale collection, but as Bob and Marge can testify, I stock a good brand of whisky and Janice and I would be pleased to welcome you and make you feel at home

With best regards


Brian Brass

(a) HISTORICAL BACKGROUND

Until the techniques had been mastered of storing the crops which they had grown, the development of the early civilizations was static and retarded. The ability to fashion rudimentary tools and the baking of clay meant not only progress, but also the capacity to travel. About 10,000 BCE, the first tribes began to migrate from the North African highlands and sought to relocate themselves in the fertile valleys of the Middle East. Rivers provided transportation, irrigation and food and the early communities became established in the lands of the Bible. They were concentrated along the banks of the River Nile in Egypt, and the Tigris and the Euphrates in Mesopotamia. Over a period which spanned countless centuries, these early people developed from primitive tribal association to a highly complex socialised existence by their ability to communicate ideas of motion and numeration. Among the early knowledge, fire played an important role. The art of pottery from baking clay led by chance to the discovery of smelting from lumps of copper and bronze ore and hence to the creation of an article of lasting quality. Codification became a reality and metrology, the science of weights and measures (which had first begun as an art form) became a permanent feature. It steadily progressed according to the needs of man into an applied science and provides a clue as to the forces at work in shaping the social and economic environment. Each early nation recognised the need for an authoratative system for dealing with the daily necessities of buying, selling, measuring and building. Most of the early measures were based on a recurrent dependable phenomena such as the palm of the hand, the seeds of a fruit, the size of the thumb, etc. Several measures have descended to the present day such as the grain and the hand, the latter of which is still used to determine the height of horses.

The Egyptians shewed remarkable talent in the use and construction of tables of weights and measures. Using unique skills, they created extravagant and lasting structures which were architecturally so perfect that even today it is a matter of conjecture how they were built with such precision.

The Jews who developed at the same time, also became aware of the necessity of having an accurate system of weights and measures. However, being a subject people, they were differently motivated and used the same sciences in a more spiritual and profound manner. According to Josephus, an early commentator on the Bible, Cain was the originator of weights and measures. The origin lies in the root of the Hebrew word which means 'measuring rod'. (Bearing in mind Cain's godless and shameful existence he seems today to be an unlikely architect of a system designed to promote equality and harmony amongst men!) The metrology of the Bible is to a large degree based on measures which were accepted by preceding peoples, the names of the measures being also the same. In some cases the Bible explains the relationship between the measures but it is difficult today to establish their absolute values for various reasons. Not only have the measures become extinct, but they have also been identified at various times in history by values which were then current. In addition the same unit often had more than one value in the same period of time. This use of double weights was extremely common and presumably arose as each successive nation sought to impose a more precise standard than that which had prevailed before. It is also important to understand that at this time there existed side by side two fundamentally different systems of numbers. Whereas the Egyptians used a decimal system, the Babylonians used a sexagesimal system in which the base is 60 rather than 10. Thus 111 was not equal to $10^2 + 10 + 1$ but $60^2 + 60 + 1$ (or 3661). From this we have inherited today's division of the hour into 60 minutes/60 seconds, and also, presumably, the geometric division of the number of degrees in a circle.

As can be seen from the extracts which follow, there is a recurrent theme in the Old Testament equating false measure with gross deceit, evidence of the high standard of honesty required in everyday transactions. The passages leave no doubt that the offender will incur the wrath of God (PROV 11:1). The Bible demands the use of

correct measures and promises a long life to one who is careful in this matter (DEUT 25:15). The concept of 'balance' is an integral part of the Jewish philosophy, for if at the end of day, the good outweighs the bad in the scales of life, redemption is assured.

It must be remembered too that people traded with each other to a far larger degree. This was mostly through barter and therefore weighing and measuring played a greater part in daily life than in today's 'pre-packaged' era. Probably every home had a scale which would have been in daily use and the likelihood is that they were simple equal arm balances based on the principle of the 'yoke'. The Talmud (the Rabbinic dissertations on the Old Testament) mentions stalls of bakers, clothiers, wool merchants, smiths, glaziers and carpenters in ancient markets such as Emmaus. Trade was current in cattle, wine and vegetables; the basilica at Ascalon was used for selling grain. It is unlikely that any of these trades would be conducted without the use of scales both to quantify the article and measure the means of payment. (Of special interest to modern accountants was the mention of a 'stoa' in Jerusalem where there was established the Dome of Accounting wherein was recorded the daily transactions of the market place. Part of their function was also to fix the prices for the following day.) Payment for goods was by silver or gold and the Jews used the general word 'stone' to denote a weight. The shekel, the half-shekel and the talents were not only denominations of money but also represented certain weights. The Jews were forbidden to keep two different weights, one for buying that was too heavy, and the other for selling which was too light. They were allowed to have only one true weight (DEUT 25:15). The Rabbis also considered at length, rather like the Weights and Measures Inspectors of today, the degree and frequency of cleansing scales which had been used to sell food etc.

(b) EXTRACTS FROM THE OLD TESTAMENT

Table 1 shows some of the relevant extracts from the Old Testament. It is by no means exclusive because selection is very much a question of interpretation. There are also many differences in translation between the James 1st, the Revised Standard and the Soncino Editions (the Chumash). In some of the extracts it is possible to detect the recurrent biblical theme in which weights and measures were used in their metaphysical sense.

(c) VOLUME - WET AND DRY MEASURES

As with linear measures, human limbs provided the early standards. Kometz meant a 'handful' - (LEVITICUS 2:2 and 5:12) - or the grasp of three fingers. Shalish (ISIAH 40:12) is thought to be the same. Hofen (EXODUS 9:8) is the entire palm of the hand and hofnayim is two handfuls. Omer is a bundle of ears of corn and a skin is a measure of wine (1 SAM 1:24). The values of these measures cannot be precisely determined even although some of them have been preserved into the present day. Table 2 combines decimal and sexagesimal systems and their approximate equivalents are shown in litres.

(d) LINEAR MEASURE

The units of length mentioned in the Bible are similar to those in use by other ancient peoples and are mainly derived from average lengths of human limbs. The 'digit' (or fingerbreadth) was the lowest measure. Four digits naturally made a 'palm' (or handbreadth). Three palms made one span (half a 'cubit') and this latter was the distance between the tip of the little finger and the tip of the thumb with the palm extended. A 'nail' (which in our time has a value of $2\frac{1}{4}$ inches) is not a unit of Biblical or ancient peoples. Although it would seem to be a logical sequence in the scale, it was probably not sufficiently uniform to be an accepted standard.

The following passages show the precision with which the numbers from various incidents have been recorded. For example, in Genesis 6:15, God directs Noah to make the ark of gopher wood and instructs him positively with regard to the measurement viz :

".... and this is how thou shalt make it: the length of the ark 300 cubits, the breadth of it 50 cubits, and the height of it 30 cubits"

The ark was not a boat (the Hebrew root for 'ship' is quite different) but nevertheless it would seem to be a daunting task to set a 600 year old man to build a 450 foot vessel with only his three sons to assist him; (after which they had the additional problem of going on safari in order to round up two of every living thing!) Another example is in Exodus 27:1 in which God gives Moses precise measurements for the construction of the holy altar :

".... and thou shalt make the altar of acacia wood, five cubits long and five cubits broad; the altar shall be four square; and the height thereof shall be three cubits.."

Table three shows the different linear measures and their approximate present day values in millimeters.

(e) WEIGHTS AND MONEY

Weights were generally of some hard polished stone such as haematite or quartzite and the Bible refers to weights generally as 'stones'. The excavations of archaeological sites have revealed several hundreds of weights of many different systems. A set of weights appears to have been traditionally kept in a cloth bag (DEUT 25 MICA 6:11 and PROV 16:11). During the Persian period, the metal weight became a coin and the word 'shekel' (from the verb 'to weigh') came into current use both as a measure and a unit of coinage, (EZEK 4:10)

The Bible refers to seven weights : talent, mina, shekel, beka, gira, pim and kesitah.

The inter-relationship between the talent and the shekel is determined from EXODUS 38:25 & 26, from which it would seem that one talent is equal to (roughly) 3000 shekels. From the same extract, the 'beka' is equal to one half a shekel. The 'mina' was equivalent to 50 shekels (EZEK 45:12 & EZRA 2:69 & NEH 7:70 and 71). The variation in values indicates another example of 'double' standards as elsewhere it is equal to 60 shekels. Similarly with the gira (a grain of carob seed) which is equivalent to 20 or 24 shekels (EXOD 30:13).

The 'pim' is mentioned only once in the Bible (1 SAM 13:21). Its relationship with the other weights is not clear but is thought to equal about two-thirds of a shekel.

The last of the weights, the kesitah, is mentioned several times (GEN 33:19; JOSH 24:32 and JOB 42:11) and seems to be archaic. Its origin and meaning have been lost but it is suggested that it referred to the weight of a sheep or a goat.

The comparative value of the shekel in weight is thought to lie between 218 and 224 grams. It does not seem practical to attempt to compare the shekel in monetary terms.

1 EXTRACTS AND REFERENCES FROM THE OLD TESTAMENT

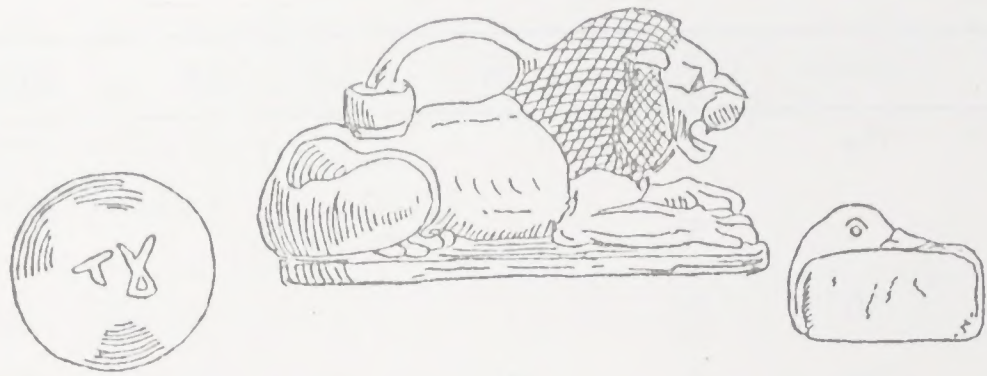
- | | | | |
|----|-------------|-------|---|
| 1 | Genesis | 6:15 | (please see text) |
| 2 | | 33:19 | and he bought for a hundred kesitah a piece of land |
| 3 | Exodus | 9:8 | take handfuls of ashes from the kiln |
| 4 | | 27:1 | (please see text) |
| 5 | | 38:25 | (please see text) |
| 6 | Leviticus | 2:2 | and he shall take from it a handful of fine flour |
| 7 | | 5:12 | and the priest shall take a handful of it as a memorial portion |
| 8 | | 19:35 | ye shall do no unrighteousness in judgement, in measures of weight or length or quantity |
| 9 | | 19:36 | you shall have just balances, just weights, a just ephah and a just hin |
| 10 | Deuteronomy | 25:13 | thou shalt not have divers weights a great and a small in thy land |
| 11 | | 25:14 | thou shalt not have divers weights a great and a small in thy house |
| 12 | | 25:15 | but thou shalt have a perfect and a just weight, a perfect and a just measure shall you have: that thy days may be lengthened in the land which the Lord thy God giveth thee |
| 13 | Amos | 8:5 | saying when will the new moon be gone that we may sell corn (again): and the sabbath that we may set forth wheat making the ephah small, and the shekel great and falsifying the balances by deceit |
| 14 | Micah | 6:11 | shall I count them pure with the wicked balances, and with the bag of deceitful weights ? |
| 15 | Proverbs | 11:1 | a false balance is an abomination to the Lord: but a just weight is his delight |
| 16 | | 16:11 | a just weight and balance are the Lord's: all the weights of the bag are his work |
| 17 | | 20:10 | divers weights and divers measures both of them alike are an abomination to the Lord |
| 18 | Isiah | 40:12 | who has measured the waters in the hollow of his hand |
| 19 | 1 Samuel | 1:24 | she took him up with her, along with a three year old bull, an ephah of flour and a skin of wine |
| 20 | | 13:21 | and the charge was a pim for the ploughshares |
| 21 | 2 Samuel | 12:30 | and David took the crown from the King's head, the weight thereof was a talent of gold |
| 22 | Job | 28:15 | (wisdom) cannot be gotten for gold, neither shall silver be weighed for the price thereof |
| 23 | | 28:25 | (and God measured) the weight of the winds: and he weigheth the waters by measure |
| 24 | | 42:11 | and each of them gave him a kesitah and a piece of gold |
| 25 | Ezekiel | 4:10 | the meat which thou shalt eat shall be by weight 20 shekels a day |
| 26 | | 45:12 | the shekel shall be 20 girahs ... and your mina shall be 50 shekels |
| 27 | Ezra | 2:69 | they gave to the treasury ... 5000 minas of silver |

2. COMPARATIVE MEASURES OF VOLUME

	HOMER	LETEKH	EPHAH	SE'AH	HIN	OMER	QAV	LOG
HOMER (KOR)	1							
LETEKH	2	1						
EPHAH (BATH)	10	5	1					
SE'AH	30	15	3	1				
HIN	60	30	6	2	1			
OMER (ISSARON)	100	50	10	3.5	1.666	1		
QAV	180	90	18	6	3	1.8	1	
LOG	720	360	72	24	12	7.2	4	1
Dry	*	*	*	*		*	*	
Liquid	*		*		*			*
Approx Present Day Values in litres	405	202	40.5	13.5	6	4.05	2.25	0.56

3. COMPARATIVE LINEAR MEASURES

	DIGIT	PALM	SPAN	CUBIT	Approximate present val. (mm)
DIGIT (fingerbreadth)	1				18.6
PALM (handbreadth)	4	1			74.0
SPAN	12	3	1		223.0
CUBIT - Standard	24	6	2	1	446.0
CUBIT - Long	28	7	-	-	521.0
REED - Standard	144	36	12	6	2,676.0
REED - Long	168	42	-	-	3,126.0



A weight found at Lachish (left) and weights in the form of a lion and a duck which were used at Ninevah



A recent acquisition